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THIN-LAYER CHROMATOGRAPHIC SEPARATION OF BENZO(a)PYRENE FROM CIGARETTE TAR.

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ABSTRACT

The current method of analyzing for benzo(a)pyrene in cigarette tar is time consuming and requires a large sample. Therefore, research was carried out to develop a new method requiring less time and a smaller sample. Two-gram samples of tar were partitioned between cyclohexane and methanol: water (4:1). The cyclohexane phase was extracted with nitromethane, and the benzo(a)pyrene was isolated from the nitromethane extract by thin-layer chromatography. The total amount of benzo(a)pyrene was determined by baseline ultraviolet adsorption, and losses were determined by isotope dilution, using C^{14}-tagged benzo(a)pyrene. Again by using isotope dilution, benzo(a)pyrene was separated from 200 milligram samples of tar (the amount from about five cigarettes) directly by thin-layer chromatography. The total amount of benzo(a)pyrene was determined by fluorescent spectroscopy, and the C^{14} benzo-(a)pyrene was determined by liquid scintillation spectroscopy. Finally, by using the above technique, benzo(a)pyrene was separated from the tar from single cigarettes. It was found that thin-layer chromatographic separations of tobacco tar are adequate to produce benzo(a)pyrene of sufficient purity that it can be quantitatively analyzed by spectroscopic means. It was also found that the analysis for benzo(a)pyrene in the tar from one cigarette is as precise as the analysis of benzo(a)-pyrene in two-gram samples of tar. The use of thin-layer chromatography and the sensitivity of liquid scintillation spectroscopy and fluorescent spectroscopy therefore permit the relatively precise and rapid analysis of the tar from a single cigarette for benzo(a)pyrene.

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